



Chapter 1 General Overview

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1.0 General Overview

1.1 Introduction

This Draft Environmental Impact Statement (DEIS) was prepared pursuant to requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, for the proposed El Paso–Las Cruces Regional Sustainable Water Project (hereafter referred to as the project). The New Mexico–Texas Water Commission (Commission), a regional planning body, is proposing the project. This proposal consists of a combination of project features that would develop a high quality, sustainable drinking water supply for the El Paso–Las Cruces region of west Texas and southern New Mexico. The project would provide an additional 174.5 million gallons per day (mgd) of surface water year-round to communities and other water users in the region.

Proposed project features include water treatment plants (WTPs) and associated facilities; aqueducts and diversion structures; aquifer storage and recovery; water acquisition by acquiring the rights to use water, and through forbearance agreements, water conservation, and water banking; and fish and wildlife enhancements and mitigation. Project features would be constructed or implemented in phases to help meet the region’s drinking water demands through the year 2030. Five action alternatives, including a Preferred Alternative, which represent different approaches to achieving project objectives and their associated project features, as well as a No Action Alternative, are described in detail in Chapter 2 of this DEIS.

The U.S. Section, International Boundary and Water Commission, United States and

Mexico (USIBWC) is the federal lead agency in the NEPA process and development of this DEIS. The El Paso Water Utilities/Public Service Board (EPWU/PSB) serves as joint lead agency (USIBWC and EPWU/PSB 1998). The U.S. Fish and Wildlife Service (FWS), U.S. Bureau of Reclamation (USBR), and U.S. Bureau of Land Management (BLM) are cooperating agencies. The Commission requested that the USIBWC serve as the federal lead agency to ensure compliance with NEPA and other federal environmental statutes, and to avoid violating water treaty provisions between the United States and the United States of Mexico (Mexico). The USIBWC is responsible for upholding those treaty provisions. The Commission designated the EPWU/PSB to serve on its behalf as the representative non-federal, joint lead agency, and as the contracting entity for environmental coordination and documentation of the proposed project (USIBWC and EPWU/PSB 1998).

1.2 Purpose and Need

1.2.1 Purpose

The proposed project deals with securing future drinking water supplies from surface sources for the El Paso–Las Cruces region. The project includes the acquisition, conveyance, treatment, and distribution of a drinking water supply, and upgrading or constructing facilities for water conveyance, treatment, distribution, and aquifer storage and recovery. These activities comprise the following three project purposes:

- Provide a year-round drinking water supply from the Rio Grande Project that is of sufficient quantity and quality to meet the anticipated municipal needs of Hatch, New Mexico; Las Cruces, New Mexico; northern and southern Doña Ana County, New Mexico; the Anthony/Canutillo area of Texas; northwest and northeast El Paso, Texas; and areas served by EPWU/PSB's Canal WTP and expanded Jonathan Rogers WTP
- Protect and maintain the sustainability of the Mesilla Bolson (ground-water basin or aquifer)
- Extend the longevity of the Hueco Bolson

Project alternatives presented in this DEIS were designed to achieve these three project purposes. In addition, the project will strive to meet the following criteria:

- The project should attempt to limit excessive total dissolved solids (salts) concentrations (maintain less than 1,000 milligrams per liter [mg/L] total salts and less than 300 mg/L sulfates) because high quality water is needed to achieve successful treatment and to meet federal drinking water standards.
- The project should seek to deliver water efficiently, and to promote water conservation.
- The project should provide overall benefits to the riverine ecosystem—particularly aquatic and riparian habitats.

The project recognizes and accepts existing institutional and social constraints. The project would continue to

meet treaty, compact, and contract requirements for delivery of Rio Grande Project waters. The project would not adversely affect the quantity and quality of water deliveries to agricultural users; impose new responsibilities on state or federal governments; or preclude other opportunities to enhance the Rio Grande ecosystem.

1.2.2 Need and Background

The need for this project is based on the region's future drinking water supply requirements. The project is necessary to avoid both potentially permanent impacts on the Mesilla and Hueco Bolsons and critical drinking water shortages in the El Paso–Las Cruces region. Population growth rates have increased sharply, increasing the demand for drinking water. It is projected that the Texas portion of the Hueco Bolson will be exhausted of all fresh water by the year 2025 because water is being pumped from the aquifer faster than it can be naturally replenished (Commission 1998). If additional surface waters are not made available to supplement the drinking water supply, water shortages in the region will likely lead to severe health and sanitation problems. Water supplies would be even more limited during periods of drought. Therefore, a need exists for contingency water supplies during drought conditions.

Water issues associated with the lower Rio Grande have been known for a number of years. The City of El Paso, with nearly 700,000 residents, is the third fastest-growing metropolitan area in the nation. In addition, more than 1.5 million people reside in Ciudad Juárez (Cd. Juárez), Chihuahua, Mexico, immediately across the Rio Grande from El Paso (Commission 1999). A total of approximately 2.5 million people live in the El Paso/

Las Cruces/Cd. Juárez region, with the region's population expected to increase to about 3.5 million people by the year 2010 (Commission 1998). The region's rapid growth rate, together with a diminishing ground water supply, has resulted in an imminent and serious water supply problem.

Currently, El Paso obtains about 43 percent of its water supply from the Rio Grande, 40 percent from the Hueco Bolson, and 17 percent from the Mesilla Bolson (Commission 1998, 1999). El Paso, Cd. Juárez, and various private industries are extracting local ground water faster than it can be replenished. The Texas portion of the Hueco Bolson is being heavily mined, and will be exhausted of fresh water by the year 2025 (Commission 1998). The Mexico portion of the Hueco Bolson could be exhausted much sooner (Commission 1999). By comparison, future water supply problems in the Las Cruces area are expected to be less severe, although continued rapid growth will result in increased municipal and industrial (M&I) water needs for southern New Mexico, as well.

For El Paso, ground water supply problems are compounded by a seasonally limited and sometimes quality-limited surface water supply. El Paso began drawing surface water from the Rio Grande in 1941, a process made available through the Rio Grande Project, which was authorized by Congress in 1905 to supply agricultural water to the El Paso–Las Cruces region (U.S. Department of the Interior 1981; USIBWC 1996). The Rio Grande Project also provides a mechanism for annually delivering 60,000 acre-feet of treaty water from the United States to Mexico according to allocations agreed to by the two countries under the Convention of 1906 (USBR 1995; USIBWC 1996).

Through subsequent acquisition of agricultural rights to use water, El Paso has increased its present water supply from the Rio Grande to meet nearly half (43 percent) of its M&I water needs (Commission 1998). However, these surface water supplies are only available during the 8-month primary irrigation season (generally March through October), when water is released from Elephant Butte and Caballo Reservoirs on the Rio Grande. Low flows and, at times, poor water quality (including, for example, high levels of salinity, sulfates, chlorides, and bacteria) prevent the use of river water during the remainder of the year (generally November through February), which is referred to as the secondary irrigation season. El Paso's two existing WTPs, Canal and Jonathan Rogers, are unable to process Rio Grande water to meet federal drinking water standards during this yearly time period and must be shut down. As a result, El Paso depends entirely on ground water from the Hueco and Mesilla Bolsons to meet its M&I needs from November through February.

The seven-member Commission was created in 1991 as a part of the Settlement Agreement from a lawsuit in which El Paso sought permits to pump New Mexico ground water for use in Texas. The Commission was created in an attempt to address some of the challenges described above, and in response to concerns regarding water supply in the rapidly growing El Paso–Las Cruces region. Previous attempts by others to resolve the increasingly acute water supply shortage, water quality, and river habitat issues had been unsuccessful. With representatives from local water districts, municipalities, government agencies, and universities, the Commission provides a forum to plan for the future development and use of water resources in the El Paso–Las Cruces

region. The Commission consists of four New Mexico representatives and three Texas representatives, as follows:

- New Mexico
 - City of Las Cruces
 - Doña Ana County
 - Elephant Butte Irrigation District
 - New Mexico State University
- Texas
 - El Paso County Water Improvement District No. 1 (EPCWID No. 1)
 - EPWU/PSB
 - University of Texas at El Paso

The Commission created the El Paso–Las Cruces Regional Sustainable Water Project. The project’s primary mission is to provide a long-term sustainable drinking water supply for the El Paso–Las Cruces region that meets continuing population growth needs and water quality requirements, and protects local aquifers. Specific project objectives identified by the Commission include the following (USIBWC and EPWU/PSB 1998):

- Improve and protect surface water and ground water quality
- Preserve and protect the Hueco and Mesilla Bolsons
- Implement year-round delivery of Rio Grande surface water that will enhance agricultural and municipal water supplies and the riverine ecosystem
- Increase water supplies through more efficient delivery, water conservation, and water treatment means
- Continue to meet treaty, compact, and contract requirements for deliveries of Rio Grande Project waters

The Commission established a project team of engineering, environmental, and public involvement specialists to fully address, define, and evaluate the project and its needs. The project team is directed by a Steering Committee, which consists of members of the Commission’s Management Advisory Committee (MAC) and representatives from the USIBWC, FWS, USBR, and environmental community.

1.3 Location of the Project

The project area is centered in the El Paso–Las Cruces region of west Texas and southern New Mexico, as indicated in Map 1.3-1. However, because of potential upstream and downstream interactions among proposed project features and river and reservoir hydrology, the project area is defined as extending approximately 200 miles along the Rio Grande from Elephant Butte Reservoir in New Mexico to Fort Quitman in Texas. Prominent existing regional features within the project area include the Rio Grande, two main stem storage reservoirs in New Mexico (Elephant Butte and Caballo), and six main stem diversion dams (Percha, Leasburg, and Mesilla Diversion Dams in New Mexico; American, International, and Riverside Diversion Dams in Texas). Map 1.3-1 also shows the cities of El Paso, Las Cruces, and Cd. Juárez; smaller communities such as Hatch, Anthony, and Canutillo; international, state, and county boundaries; and approximate locations of the Mesilla and Hueco Bolsons.

1.4 Authorizing Actions, Permits, and Licenses

Table 1.4-1 lists the actions, permits, and licenses required to implement any of the action alternatives for the proposed

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TABLE 1.4-1
Authorizing Actions, Permits, and Licenses

Agency or Organization	Actions, Permits, and Licenses Required	Description
Federal Agencies		
U.S. Section, International Boundary and Water Commission, United States and Mexico (USIBWC)	National Environmental Policy Act (NEPA) compliance	USIBWC is the lead agency and is jointly responsible for ensuring compliance with NEPA and other environmental statutes, overall coordination of the environmental review, approving the alternative selected for construction, and signing the Record of Decision (ROD).
	Upholding provisions of the 1906 Convention and 1907 Treaty between the United States and Mexico	USIBWC is the designated federal agency responsible for meeting the United States' obligation under the convention to annually deliver 60,000 acre-feet of water to Mexico. USIBWC must ensure that those deliveries would continue, unaffected by the project.
	Licenses for Rio Grande crossings and other USIBWC-related issues	USIBWC reviews applications and issues licenses for pipeline crossings of the river, alteration of the river channel, changes in water delivery to Mexico, and changes to USIBWC facilities resulting from the construction, operation, and maintenance of project features.
	Archaeological Resources Protection Act (ARPA) Permit	USIBWC issues an ARPA Permit for ground disturbances on Federal land it administers.
U.S. Fish and Wildlife Service (FWS)	Endangered Species Act (ESA) (Section 7 consultation)	Consultation under Section 7 of ESA is required to determine if the project will affect threatened or endangered species. FWS will prepare a Biological Opinion based on the lead and joint agencies' Biological Assessment.
	Fish and Wildlife Coordination Act (FWCA) Report	FWS must prepare a FWCA Report that determines impacts on fish and wildlife and recommends ways to avoid or mitigate those impacts.
U.S. Army Corps of Engineers (COE)	Permit pursuant to Section 404 of the Clean Water Act (CWA)	COE will potentially issue a CWA 404 Permit, which will be required for excavation or discharge of fill material into waters of the U.S., including wetlands.

TABLE 1.4-1
Authorizing Actions, Permits, and Licenses

Agency or Organization	Actions, Permits, and Licenses Required	Description
	Section 401 Water Quality Certificate of the CWA	COE coordinates the water quality certification process with the states of New Mexico and Texas for applicable project features.
	Nationwide Permits for Utility Line Crossing (COE Permit 12)	COE will potentially issue a permit, which will be required for arroyos crossed by project utility lines.
	Wetland mitigation plan, if needed, for impacts on nonagricultural lands	COE must approve the delineation, impact analysis, and preparation of wetland mitigation plan for jurisdictional wetlands impacted by the project on nonagricultural lands for the CWA 404 permit.
Natural Resources Conservation Service (NRCS)	Wetlands delineation on agricultural lands	NRCS will delineate wetlands on agricultural lands, if needed, under the Food Security Act (FSA).
U.S. Environmental Protection Agency (EPA)	Oversight authority for Section 404 Permits	EPA will review 404 permit applications and recommend approval or denial of permits. EPA has authority to veto COE permit approvals.
	Section 402 National Pollutant Discharge Elimination System (NPDES) Permit	EPA jointly issues or coordinates with the States of New Mexico and Texas in issuing NPDES Permits, as required, for applicable project features in New Mexico and Texas.
U.S. Bureau of Reclamation (USBR)	Approve water use conversion and enter into and administer third-party water contracts	USBR must approve project-related changes in operating procedures for the delivery of water and the conversion of water from agricultural use to municipal and industrial (M&I) use. USBR will enter into contracts with Elephant Butte Irrigation District (EBID) and/or El Paso County Water Improvement District No. 1 (EPCWID No. 1) and the project sponsor for the proposed projects. They also will enter into contracts with El Paso Water Utilities/Public Service Board (EPWU/PSB) and EPCWID No. 1 for other specific, related facilities or actions involving water supply, savings, exchange, and use.

TABLE 1.4-1
Authorizing Actions, Permits, and Licenses

Agency or Organization	Actions, Permits, and Licenses Required	Description
U.S. Bureau of Land Management (BLM)	Right-of-ways (ROWs) for use of lands and an Archaeological Resources Protection Act (ARPA) Permit for disturbing grounds administered by BLM	BLM will potentially issue a ROW and ARPA Permit for the Anthony Gap waterline crossing through the Organ Mountains' Area of Critical Environmental Concern (ACEC).
U.S. Department of the Army	Consultation with Fort Bliss regarding archeological resources and threatened and endangered species	Construction on lands administered by Fort Bliss and Biggs Army Airfield will require compliance with the National Historic Preservation Act of 1966, as amended, and the Endangered Species Act of 1973, as amended.
State Agencies		
New Mexico Department of Game and Fish (NMDGF) and Texas Parks and Wildlife Department (TPWD)	Managing and consulting on fish and wildlife in New Mexico and Texas with concurrent responsibility for the FWS FWCA Report.	The Departments will comment on the FWCA Report. If they can not concur with FWS, they may prepare their own FWCA Report(s).
New Mexico Historic Preservation Division, State Historic Preservation Officer (SHPO) and Texas Historical Commission, SHPO	New Mexico and Texas Antiquities Permits Signatories to a Programmatic Agreement, if needed, with project sponsors and the Advisory Council on Historic Preservation (ACHP) to guide future studies and mitigation.	Approval of survey and recovery of cultural resources in New Mexico and Texas prior to project construction. The SHPOs and ACHP will determine if the proposed project will have an impact on culturally or historically sensitive sites listed in New Mexico and Texas, or if sites are eligible for listing on the National Register of Historic Places.

TABLE 1.4-1
Authorizing Actions, Permits, and Licenses

Agency or Organization	Actions, Permits, and Licenses Required	Description
New Mexico Environment Department (NMED) for project features in New Mexico and Texas Natural Resource Conservation Commission (TNRCC) for project features in Texas	Section 401 Water Quality Certificate (CWA)	These agencies, working with the COE, issue Water Quality Certificates for applicable project features in New Mexico and Texas.
	Section 402 National Pollutant Discharge Elimination System (NPDES) Permit	These agencies issue or coordinate with EPA in issuing NPDES Permits, as required, for applicable project features in New Mexico and Texas.
	Section 404 Dredge and Fill Permit (CWA)	These agencies coordinate with the COE, the federal agency responsible for issuing Section 404 Permits.
	Stream Alteration Permit	These agencies issue permits for project features affecting the river bed in New Mexico and Texas.
	WTP License	These agencies issue licenses for the construction and operation of WTPs.
	Texas Air Quality Permit	TNRCC issues an Air Quality Permit for emissions associated with water pumping as part of the aquifer storage and recovery (ASR) program.

TABLE 1.4-1
Authorizing Actions, Permits, and Licenses

Agency or Organization	Actions, Permits, and Licenses Required	Description
New Mexico Department of Transportation (NMDOT) and Texas Department of Transportation (TDOT)	Encroachment Permits	NMDOT and TDOT must issue permits to construct or modify project features in state highway ROWs in New Mexico and Texas.
Other Agencies and Organizations		
El Paso Water Utilities/Public Service Board (EPWU/PSB)	Joint lead agency	EPWU/PSB is the joint lead agency responsible with USIBWC for ensuring compliance with NEPA and other environmental statutes, overall coordination of the environmental review, approving the alternative selected for construction, and signing the Record of Decision (ROD).
	Makes decision to construct and requests funds for project and construction and acquisition of project lands and water, as required, for its facilities in Texas on behalf of the City of El Paso. Enters into agreements to construct and operate project features in Texas.	EPWU/PSB will enter into the necessary agreements and contracts associated with project construction, operation, and maintenance. EPWU/PSB must enter into agreements with various entities, such as water management agencies and communities, where project features would be constructed that describe the terms of operation and maintenance for those features.
	Well Drilling Permit	EPWU/PSB reviews applications and issues permits for drilling wells (for example, the ASR program) in the Utility's service area in the City.
Governments of Las Cruces, Hatch, and Doña Ana County (or Anthony Water and Sanitation District)	Make decision to construct and request funds for project construction and acquisition of project lands and water, as required, for their facilities in New Mexico on behalf of their respective communities. Enter into agreements with various entities to construct and operate project features in New Mexico.	These entities will enter into the necessary agreements and contracts associated with project construction, operation, and maintenance. These entities must enter into agreements with various other entities, such as water management agencies, where project features would be constructed that describe the terms of operation and maintenance for those features.

TABLE 1.4-1
Authorizing Actions, Permits, and Licenses

Agency or Organization	Actions, Permits, and Licenses Required	Description
Elephant Butte Irrigation District (EBID), New Mexico	Rio Grande Project, New Mexico portion	EBID operates and maintains the New Mexico portion of the project's irrigation division through contract with the USBR. As such, it would be responsible for selling the water to the Governments of Las Cruces, Hatch, and Doña Ana County (or Anthony Water and Sewer District).
	Rights-of-Use Licenses and Permits	EBID reviews applications and issues leases, permits, licenses, and agreements for the occupation, use, or traversing of lands under the ownership, administration, or management of EBID. Examples are dewatering and utility crossing permits.
El Paso County Water Improvement District No. 1 (EPCWID No. 1), Texas	Rio Grande Project, Texas portion	EPCWID No. 1 operates and maintains the Texas portion of the project's irrigation division through contract with the USBR. As such, it would be responsible for selling the water to EPWU/PSB.
	Right-to-Use Licenses	EPCWID No. 1 reviews applications and issues licenses for the purchase, exchange, easement, lease, or other right-to-use EPCWID No. 1 real property. Examples are dewatering and utility crossing permits.
Doña Ana County Government, New Mexico and El Paso County Government, Texas	ROW and Miscellaneous Permits	Doña Ana and El Paso Counties will need to issue permits for project features in New Mexico and Texas and, as needed, including permits to construct in County road ROWs.
Governments of Las Cruces, Hatch, Salem, Garfield, Rincón, Doña Ana, Radium Springs, San Miguel, Mesquite, Anthony, Vado, Berino, Chamberino, La Mesa, and La Union, New Mexico and Government of El Paso, Texas	Miscellaneous permits and approvals	Communities may require permits or approvals for activities affecting local roads, drainage structures, and utilities.

project. These authorizations are necessary to complete the NEPA process and to gain project approval prior to construction. The table briefly defines the required action, permit, or license, and the agency or organization responsible for each.

1.5 Interrelated Projects

Council on Environmental Quality (CEQ) guidelines for preparing EISs require that cumulative impacts be addressed in addition to direct and indirect effects. Cumulative impacts are those incremental impacts that result from the action when added to other past, present, and reasonably foreseeable future actions. This section discusses those potential interrelated projects that may result in cumulative impacts.

1.5.1 Past Interrelated Projects

Water development and irrigation projects authorized through congressional acts have had a major influence on the Rio Grande's El Paso–Las Cruces region for nearly a century. Two of the earliest examples are the *Reclamation Act* of June 17, 1902, and the *Extend Reclamation Act to Texas Act* of June 12, 1906 (USBR 1995). Through these acts, Congress provided general authorization for the construction of irrigation projects to reclaim arid and semiarid lands, and to encourage the settlement and cultivation of western lands by storing, diverting, and developing water for irrigation (USBR 1995). These and later projects directly affected agricultural production within the region, as well as the river's natural flow regime and ecological function.

Canals and simple diversion structures were used during the mid-1800s, but they were temporary and could not withstand

the destructive forces of river flood events. However, by 1890, settlement and irrigation development in southern Colorado and central New Mexico had contributed to reduced or depleted summer flows in the Rio Grande, increasing the frequency and duration of river drying downstream at El Paso (USDI 1981).

The Rio Grande Project, authorized in 1905, was one of the first projects constructed under the Reclamation Act (USBR 1995). The Rio Grande Project was designed to provide sufficient water to meet regional irrigation requirements in New Mexico and Texas, as well as meet Mexico's claims for loss of water based on ancient prior right (USDI 1981). The Rio Grande Project consists of various facilities on or near the Rio Grande, including the two main stem storage dams and reservoirs of Elephant Butte and Caballo; a power generating plant at Elephant Butte Dam; five main stem diversion structures (Percha, Leasburg, Mesilla, American, and Riverside); and more than 1,000 miles of canals, laterals, and drains (USBR 1995). Project water for New Mexico is delivered by the Elephant Butte Irrigation District, while project water for Texas is delivered by the EPCWID No. 1. The USIBWC is the designated federal agency responsible for meeting provisions of the Treaty between the United States and Mexico, based on the Convention of 1906 between the two countries and ratified in 1907, for annually delivering 60,000 ac-ft of Rio Grande Project water to Mexico (USBR 1995). All Rio Grande Project water distributions are used for agricultural purposes, except in Texas where approximately 50,000 ac-ft/yr of agricultural waters are used for M&I purposes. Reservoir releases and surface water supplies for the Rio Grande Project are generally only present in the

river during the 8-month primary irrigation season from March through October.

A second important project authorized by Congress, the Rio Grande Canalization Project of 1936, affected the function and nature of the Rio Grande. The Canalization Project extends about 105 miles along the Rio Grande from the Percha Diversion Dam to the American Diversion Dam, and consists of a normal flow channel and a leveed floodway. The river channel is 3 to 5 feet deep and 110 to 500 feet wide. The floodway is 50 to 2,100 feet wide and the bordering levees are 3 to 15 feet high (USIBWC 1979). The Canalization Project ensures that water released from Elephant Butte and Caballo Dams for downstream diversion to Mexico is conveyed effectively, and that lands along the project are protected from floods. The storage of water in Elephant Butte Reservoir, reduction of downstream flow rates, and subsequent deterioration of the natural river channel from sedimentation and vegetation growth led to the Canalization Project (USIBWC 1979). In addition, arroyo floodwaters that entered the Rio Grande downstream of Elephant Butte Dam deposited sediments, flowed over the channel banks onto the valley floor, and damaged crops and irrigation structures. Uncontrolled diversions of low-flow releases from the reservoirs prior to the Canalization Project also impacted the United States' ability to deliver allotted treaty waters to Mexico (USIBWC 1979).

A third, closely related project that affected the function, nature, and appearance of the Rio Grande and its floodplain is the Rio Grande Rectification Project of 1933 (USIBWC 1979). The United States and Mexico agreed to jointly construct, operate, and maintain the Rectification Project, which straightened,

stabilized, and shortened river boundary through the El Paso–Juárez Valley downstream of the American Diversion Structure to Fort Quitman from 155 miles to its present length of 83 miles. The Rectification Project provided a means to control the valley's periodic floods while avoiding potential damage to agricultural crops and urban lands (USIBWC 1979). However, it eliminated the natural meandering pattern of the Rio Grande and its associated aquatic and riparian habitat by primarily confining the river within levees.

1.5.2 Future Interrelated Projects

An extensive survey was conducted to identify other reasonably foreseeable projects potentially occurring within the project area that could result in significant cumulative environmental impacts when combined with the effects of the proposed project. Table 1.5-1 summarizes the nature of the other projects expected to occur in or near the project area. Each project was evaluated to determine if it was sufficiently defined, or reasonably foreseeable, to be relevant to potential impacts of the proposed project, within the proposed project's area of influence, and of a magnitude that would result in a substantive cumulative impact. Table 1.5-1 identifies the projects that may meet all of these criteria, as well as other projects that do not, and why. Potential cumulative impacts resulting from combinations of those projects that may meet all of the criteria with the proposed project are addressed in the appropriate resource areas in Chapter 3 of this DEIS.

1.6 Alternatives

This section describes how alternatives were formulated, which alternatives were

TABLE 1.5-1
Projects Considered for Cumulative Impact Analysis

Project Name	Description	Included in Cumulative Impact Analysis?	Reason Excluded
Far West Texas Regional Water Plan	50-year water resource plan required by Senate Bill 1	No	Not a project; just a plan.
Riverside Canal Lining	EPCWID No. 1 ongoing program to conserve water	Yes	
Riverside Diversion Dam	Potential removal of this facility	No	Not sufficiently defined.
Jonathan Rogers WTP Expansion (from 40 to 60 mgd)	Current increase in plant capacity	No	Will be completed well before the project. It will be assumed to be in the existing water management system.
Rio Grande Project (Operating Plan)	Legal action related to an operating plan for the Rio Grande Project	No	Not sufficiently defined.
Juárez, Mexico Sustainability Project	Water master plan for Cd. Juárez	Yes	
Santa Teresa Anapra Economic Development Plan	Development associated with Santa Teresa Port of Entry	No	Not sufficiently defined.
USIBWC Canalization and Rectification Projects	Updating management plans and NEPA compliance for USIBWC's Canalization and Rectification Projects	Yes	
Canutillo Flood Control	COE arroyo flood routing study	No	Not sufficiently defined.
Annexation of East and West El Paso	Potential annexation of new lands into El Paso	No	Not sufficiently defined and not of a magnitude to result in substantive cumulative impact.
NAFTA Restrictions Terminated	NAFTA tariffs phase out	No	Not relevant to the project.
White Sands	Various developments at White Sands Missile Range	No	Not the same area of influence.
Spaceport	Potential development of a spaceport at White Sands Missile Range	Yes	

TABLE 1.5-1
Projects Considered for Cumulative Impact Analysis

Project Name	Description	Included in Cumulative Impact Analysis?	Reason Excluded
Upper Valley Wastewater Treatment Plant	Development of a 10-mgd wastewater treatment plant by EPWU	Yes	
Desalination Plants	Potential desalination plants to treat saline waters pumped from the Hueco Bolson	Yes	
Intermodal Transportation Project in El Paso	A plan to develop a transportation hub in NE El Paso including air, trucks, and rail modes	No	Not relevant to the Sustainable Project.
Rail Switchyard Relocation	Potential move of the Union Pacific rail yards to SW El Paso	No	Not relevant to the Sustainable Project.
Silvery Minnow Critical Habitat Designation	Proposal to designate sections of the middle Rio Grande as critical habitat, thus changing the flow regimes	No	Not relevant to the Sustainable Project.
Albuquerque Water Resource Program (SJ-C)	A program to switch Albuquerque use of ground water to surface water, including their San Juan–Chama rights	No	Not within the Sustainable Project area of influence.
USIBWC Boulder Clusters	A program by USIBWC to mitigate for dredging of the Rio Grande where arroyos deposit material from floods	No	Not of sufficient magnitude to result in a substantive cumulative impact.
Bustamante Expansion	An expansion of EPWU's Bustamante Wastewater Treatment Plant	No	Will be completed well before the Sustainable Project. It will be assumed to be in the existing water management system.
Canutillo Well Field Master Plan	A plan for the future development of the Canutillo Well Field	No	Not of sufficient magnitude to result in a substantive cumulative impact.

selected for detailed analysis, and which alternatives were considered but not selected for detailed analysis. Alternatives selected for analysis are described in detail in Chapter 2 of this DEIS.

1.6.1 Formulation of Alternatives

Initially, five action alternatives were formulated to meet the project objectives developed by the Commission (see Section 1.2.2, *Need and Background*).

Development of alternatives for the project began soon after the Commission was formed in 1991. The project itself was identified as such in 1997. During that period a number of project concepts were evaluated. One of the early concepts was to bring water to El Paso via a pipeline from Caballo Reservoir. This was eventually rejected by the Commission because of its cost and lack of political and public acceptance.

A number of other features were addressed during the development of the project. These include a regional WTP at Santo Tomas and a WTP at Sunland Park. The Santo Tomas site was dismissed in favor of the Upper Valley site. The lack of strong support from the Sunland Park area led to their potential plant being excluded from the project. Similarly, a pipeline to Chaparral, New Mexico, was considered but finally excluded because of lack of interest.

A study was conducted of the New Mexico–Texas Aqueduct, which included relining the West Side Canal as well as a pipeline. Cost and operational flexibility issues lead to the selection of a pipeline. A study was also conducted on the feasibility of developing the Socorro Ponds for water storage. Excessive costs in the comparison

with storage capacity resulted in the feature being excluded in the project.

Early in the NEPA process a series of alternatives were developed that met the basic goals of the project and strived to allow secondary irrigation season operation of the Canal and Jonathan Rogers WTPs through various drain mitigation strategies. These alternatives were identified as follows:

- 1A—Improved West Side Canals with Narrows Conveyance
- 1B—Canal and River Conveyance
- 2—River/Pipeline Conveyance with Regional WTP
- 3A—River and Narrows Conveyance
- 3B—River Conveyance with Drain Bypass

The five action alternatives were formulated by blending different combinations and options of proposed project elements to meet the Commission’s project objectives. The proposed project elements consist of the following:

- Surface water diversion—surface water allocated for M&I use would be diverted from the Rio Grande at existing or new diversion structures.
- Raw water conveyance—raw water would be conveyed to existing or new WTPs using the river, canals, laterals, or pipelines.
- WTPs—raw water would be treated at new, existing, or expanded WTPs.
- Treated water transmission—treated water would be transmitted from

WTPs to M&I water users through a water distribution system, including pump stations and water storage reservoirs.

- Drain management strategies—water quality impacts resulting from irrigation drain return flows would be mitigated by segregating flows, impounding/releasing flows, and managing saline lands through irrigation practices, or through ground water dilution.

A NEPA Alternatives Planning Workshop was conducted at UTEP June 16, 1998. Approximately 60 workshop participants reviewed the project background, discussed the five water supply alternatives that had been formulated, and provided input on developing screening criteria so that subsequent environmental impact studies could focus on the most reasonable and practical alternatives (CH2M HILL 1999). Unresolved issues potentially affecting alternative features and project elements were identified, and potential modifications to the alternatives were discussed, including the following:

- Add elements to meet other water supply needs, such as the Lower Rio Grande Water Users Association WTP
- Consider other water supply aspects, such as off-stream storage of wet-year waters; surface recharge basins; prevention of periodic non-compliance with federal and state drinking water standards; reliance on ground water when water quality is poor (drought contingency plans); and reconciling differences between New Mexico and Texas water quality regulations
- Develop an alternative that focuses on the environment or add, to the

alternatives, environmental enhancement features such as wetlands, tree planting, drain habitat improvements, controlled flooding within levees, or alternative USIBWC maintenance practices for mowing lands

- Control phreatophytes (deep-rooted plants)

There was no general consensus among workshop participants that these potential modifications would be feasible or necessarily desirable.

The five action alternatives were evaluated using five screening criteria based on project objectives, stakeholder values, technical reality, and relative importance. These evaluation criteria, their relative importance (weighted by percent), and their associated sub-criteria or measures of performance included the following:

- Reliable/Sustainable (25 percent)—operational reliability, firm yield/drought susceptibility, water quality, and impacts on agriculture
- Implementable (25 percent)—inter-regional jurisdictional issues, user-entity criteria, regulatory agency and permitting criteria, and public support
- Environmental (20 percent)—restoration, enhancement, and the protection of habitat, cultural resources, water quality, and water quantity
- Financial (20 percent)—project costs, environmental mitigation costs, and funding potential
- Quality of Life (10 percent)—balance agricultural concerns with urban needs,

promote water conservation, and
promote recreational opportunities

Results of the alternatives' evaluation were discussed at a NEPA Alternatives Preliminary Screening Workshop at UTEP on August 5, 1998 (CH2M HILL 1999). Based on the screening evaluation and workshop discussions, three of the five action alternatives initially formulated (1B, 3A, and 3B) were selected for further analysis while two (1A and 2) were dismissed from further analysis.

The three action alternatives selected for detailed analysis were identified to the public at scoping meetings in Anthony and Las Cruces, New Mexico, and in El Paso, Texas, during September 1998. Action alternatives 1B, 3A, and 3B listed earlier were judged to be near or above average in all of the areas evaluated during the alternatives' screening process. These three alternatives provided the foundation for the action alternatives as they evolved in response to further definition and refinement of project needs, and to an increased engineering and biological understanding of the most reasonable and practical ways of achieving project objectives.

The responses received during the scoping meetings indicated a general discomfort with the drain mitigation strategies. Primary concerns dealt with potential impacts on water quality below American Diversion Dam and the effects on water delivered to Mexico, and costs and access associated with pipelines. As a result, the drain mitigation features were eliminated and new alternatives were developed. One of the key assumptions that helped guide the new alternatives was that the existing Canal WTP and expanded Jonathan Rogers WTP would not operate in the secondary irrigation season. Another was

that concepts were developed that would allow diversion of water directly from the river without diversion dams. One concept was to use Ranney collectors but that proved infeasible because of the tight geology beneath the river bed. Eventually, a method of capturing flows at the side of the river was accepted.

1.6.2 Alternatives Selected for Analysis

Five action alternatives were subsequently developed for detailed analysis and are described in detail in Chapter 2 in the following order. They consist of the following:

- River with Local Plants
- River with Year-Round Lower Plants
- River with Combined Plant
- Aqueduct with Local Plants
- Aqueduct with Combined Plant

The two aqueduct alternatives, the River with Local Plants Alternative, and the River with Combined Plant Alternative were approved for inclusion in the DEIS by the project Steering Committee in September 1999. To determine a Preferred Alternative, an analysis of the four alternatives was conducted using the same approach followed in the June 16, 1998, and August 5, 1998, workshops. The results were presented at an October 5, 1999, workshop. The Commission selected the River with Local Plants as the Preferred Alternative on October 15, 1999. In response to the requests at the workshop, the Commission also approved the inclusion in the DEIS of a fifth alternative that would deliver sufficient water quantity and quality to operate the existing Canal WTP and expanded Jonathan Rogers WTP all year. Thus, the

River with Year-Round Lower Plants Alternative has been included in the EIS.

A No Action Alternative also was identified to the public at scoping meetings, and was based on the following assumptions:

- No plan would be developed to solve the projected water shortage.
- The Hueco Aquifer ground water supply would be depleted by the year 2035 at the latest.

- Year-round flows would not be provided in the Rio Grande and local aquifers would not be protected.
- Existing facilities may be maintained or improved by agencies but no new facilities would be constructed.

The No Action Alternative presented at public scoping meetings provided the basis for the No Action Alternative described in Chapter 2, *Description of the Alternatives*, of this DEIS.